**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 2 | STRAND: MEASUREMENT & GEOMETRY | **SUB-STRAND: VOLUME AND CAPACITY 1** | **WORKING MATHEMATICALLY:** **MA3-1WM & MA3-3WM** |
| OUTCOMES: MA3-11MG | **Selects and uses the appropriate unit to estimate, measure and calculate volumes and capacities, and converts between units of capacity.** |
| **CONTENT:**  | **Choose appropriate units of measurement for volume and capacity.*** Construct and use the cubic metre as a unit to measure larger volumes
* Explain why volume is measured in cubic metres in certain situations, e.g. wood bark, soil, concrete
* Recognise that a cubic metre can have dimensions other than a cube of side 1 metre
* Record volumes using the abbreviation for cubic metres ($m^{3}$)
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Students brainstorm items/objects/situations where volumed would be measured in cubic metres.
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| WARM UP / DRILL | * **Revise** the cubic centimetre – students create 3D models using centicubes with a volume of 18$ cm^{3}$, 26$ cm^{3}$ and 35 $ cm^{3}$.
* **Times Table Drill-** students participate in a whole class times table game (e.g. Buzz Off, Bing Bang Bong, etc).
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| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | * John is digging a hole for a new swimming pool. How many cubic metres of dirt did John remove from a hole that is 5 metres long, 4 metres wide and 3 metres deep?
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| QUALITY TEACHING ELEMENTS | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge
* Deep understanding
* Problematic knowledge
* Higher-order thinking
* Metalanguage
* Substantive communication
 | * Explicit quality criteria
* Engagement
* High expectations
* Social support
* Students’ self-regulation
* Student direction
 | * Background knowledge
* Cultural knowledge
* Knowledge integration
* Inclusivity
* Connectedness
* Narrative
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| RESOURCES | Student grid-books, rulers, worksheets on volume and capacity (cubic centimetres), IWB visual presentation on volume andcapacity, |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * **Explicitly communicate lesson outcomes and work quality.**
* **Define and reinforce metalanguage used in the unit** e.g. volume, capacity, mass, three-dimensional shape (3D shape), prisms, cube, rectangular prism, full, space, cubic-centimetre, cubic-metre, container, centicubes, displace, side, face, regular shape, irregular shape, edge, millilitre, litre, packing, layers, mL, $cm^{3}$, $m^{3}$
* **Discuss** with students the need for a larger unit of measurement than the cubic centimetre $cm^{3}$.
* **Brainstorm:** Students identify as many situations possible, where cubic metres are used to measure volume.
* **Object sort:** On the IWB, sort objects into two groups; those objects that are measured in $cm^{3}$ and those, which are measured in $m^{3}$.
 | LEARNING SEQUENCERemediationS2 or Early S3 | * Review terms in volume and capacity, using manipulatives as needed.
* Revise the cubic centimetre.
* Explain why volume is calculated in cubic centimetres and cubic metres.
* Students calculate how many centimetres are in a metre.
* Students fill containers with centicubes to find the volume.
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| LEARNING SEQUENCES3 | * **How big is a cubic metre?** Using newspaper and masking tape, students construct a model of a cubic metre. This activity could be completed as a challenge- students have 30 minutes to create a cubic metre model.
* **Investigation:** Students estimate and explore how many base 10 cubes would be needed to cover the base of the cubic metre model. Students then calculate how many layers would be needed to fill the cubic metre model.
* **Investigation:** Students investigate the volume of the classroom. After estimating, students use rulers and measuring tapes, to measure the length, width and height of classroom walls.
* **Swimming Pool Construction:** Students decide upon the dimensions of a school swimming pool with a depth of 2 metres.
* **Claustrophobia:** Students calculate how many students can fit inside their swimming pool design.
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| LEARNING SEQUENCEExtension Late S3 | * Students solve the following problems: How many days would pass before you drank the amount of milk that would fit inside 1 $m^{3}$?
* How many large base ten cubes (decimetre cubes) will fit inside a cubic metre?
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| **EVALUATION & REFLECTION** | **Student engagement: Achievement of Outcomes:****Resources: Follow up:** |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SWIMMING POOL CONSTRUCTION**

You have been nominated to decide on the volume of a swimming pool that is to be built at your school. You must decide on the dimensions of the pool (length, width, depth), however, the depth of the pool must be 2 metres.

1. Estimate how many cubic metres you think the swimming pool should be:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ $m^{3}$

1. What dimensions of the swimming pool have you decided on?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Using the measurements above, what is the volume of your swimming pool?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw a diagram of your swimming pool using the isometric dots below:



Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CLAUSTROPHOBIA**

Using your swimming pool design to complete the following activities:

1. Estimate how many students will fit inside your swimming pool: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Using a cubic metre model, measure how many students will fit inside your swimming pool.

*Working out space*

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1. Report on your findings:

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